**Objectives**

To identify barriers and facilitators that influenced the implementation of paediatric clinical pharmacy service in Hong Kong’s public hospitals from clinical pharmacists’ perspective.

**Methods**

A qualitative study based on semi-structured interviews of clinical pharmacists who practiced in paediatrics in public hospitals in Hong Kong. Interview schedule was designed based on determined themes identified in previous research and pilot testing was performed. The coding process was performed by two researchers with the resulting topics organised by thematic analysis. Consensus was reached amongst the researchers for the identification of themes that emerged during the interviews. The Consolidated Criteria for Reporting Qualitative Research guideline was followed to ensure the complete and transparent reporting of this research. Ethical approval for this study was obtained from the research ethics committee of the relevant institutions.

**Key findings**

Of the 32 clinical pharmacists from across the study sites, 12 were interviewed. Five barriers and three facilitators were identified as main themes. The barriers that were identified which hindered service implementation include the service penetration into the healthcare system, practice environment constraints, lack of affirmation from the administrative stakeholders, governance of the profession, and partnership with universities. The facilitators that were identified which enabled service implementation include other healthcare professionals’ trust and confidence in the service, the support from the pharmacy management team, and clinical pharmacists’ self-efficacy.

**Conclusion**

Clinical pharmacists interviewed reported that the successful implementation of CPS in paediatrics in public hospitals in Hong Kong is an area of continued development with several key barriers identified.

**Keywords**

Clinical pharmacy; Paediatrics; Pharmaceutical care; Professional practice.

**Introduction**

Clinical pharmacists work directly with patients and other healthcare professionals to ensure that medications contribute to the best possible health outcomes for the former group [1]. The UK National Healthcare Service supports the role that clinical pharmacists play in achieving medication optimisation, explaining that clinical pharmacists facilitate medicines optimisation by looking at the value that medicines deliver and thereby ensuring that they are clinically effective and cost-effective [2]. Special attention needs to be given to optimising medicine use in children as they are at high risk of harm resulting from medication errors, because such errors are potentially more hazardous to them relative to adults [3–5].

In 2014, the Hong Kong Hospital Authority (HA), a statutory body that governs all public hospitals within the special administrative region, implemented a clinical pharmacy service (CPS) programme for paediatric general and intensive care units in all public hospitals. Although CPSs have been provided for almost a decade now, research investigating its implementation has not been conducted yet. Formative evaluations are therefore needed to assess the extent to which CPS implementation is effective so that the benefits of the intervention could be optimised and sustained [6].

The implementation of CPSs, which is a challenging and complex process influenced by multiple factors, varies across different services; in addition, clinical pharmacists’ perceptions towards CPSs influence their implementation [7]. Although studies have highlighted that the development of Hong Kong’s CPS programme is hindered by resource limitations and the overwhelming workload of clinical pharmacists, the views of clinical pharmacists about the programme have yet to be explored using qualitative methodologies [8]. The aim of this study was to identify the facilitators and barriers that have influenced the implementation of hospital paediatric CPSs in Hong Kong from the perspective of clinical pharmacists.

**Methods**

**Study design**

Data were collected using semi-structured interviews (SSIs). SSIs have been extensively used as a rigorous data collection method for evaluating the factors that influence clinical pharmacy [9–11]. The questions in the interview schedules were based on previously determined themes and subthemes identified in paediatric CPSs [12]. The interview schedules were developed through consultations with all team members. Pilot testing was performed with three study participants to confirm the coverage and relevance of the content of the formulated guides and to identify the possible need to reformulate the questions. Since all researchers agreed that no changes needed to be made to the schedules, the data were included in the analysis.

**Participants and recruitment**

The 32 clinical pharmacists who were working within the field of paediatrics in the four (out of five) participating public hospitals (i.e. Hong Kong Children’s Hospital, Kwong Wah Hospital, Tseung Kwan O Hospital and United Christian Hospital) situated in east and central Kowloon in Hong Kong were invited to take part in this study. The non-participating hospital did not specify the reason for non-participation. Based on the average number of participants needed to achieve data saturation in similar studies [13, 14], between 10 and 15 participants were targeted for enrolment in this study. Stratified random sampling was used to capture key population characteristics across different study sites. An invitation email was sent to HA’s paediatric CPS working group representatives, requesting them to disseminate the invitation to relevant paediatric clinical pharmacists, with an information sheet and a consent form provided therein. A reminder email was sent to the representatives 1 month after the initial invitation email was delivered. Signed consent forms were received either electronically or in hardcopies prior to the interviews.

**Data collection**

Participants were given the choice to select either telephone or video conferencing via Zoom (Zoom Video Communications, USA) for their SSI. Face-to-face interviews were not recommended owing to social distancing and gathering restrictions set by local government and university policies given the COVID-19 pandemic. An inductive thematic saturation approach was used, where saturation was focused on the identification of new codes.

The interviews were conducted by the principal investigator (CS) in spoken Cantonese. The audio recordings were translated and transcribed directly into English by the principal investigator, and a sample of the translated transcripts was subsequently checked by a member of the research team fluent in spoken Cantonese Chinese (CH) for accuracy and to minimise transcriptional error. Once translated and transcribed as Microsoft Word documents, all transcripts were entered into QSR NVivo Version 12 (QSR International, Australia) to support data analysis.

**Data analysis and reporting**

The resulting topics were organised by thematic analysis as described by Braun and Clarke [15]. All the transcripts were coded by the PI, with another researcher coded 20% of the transcripts individually. The two sets of coding were then compared and discrepancies were discussed until consensus was reached amongst the researchers. The subthemes were then mapped onto the corresponding main themes in tabular form and as text description. The COREQ (Consolidated Criteria for Reporting Qualitative Research) guidelines were used to ensure the confirmability and transparency of this research [16]. Preparation of field notes, self-reflection with items on the COREQ checklist and member checking were performed during the research process to support research reflexivity.

**Ethical approval**

Ethical approval for this study was obtained from the research ethics committees of the relevant institutions (HKCH-REC-2021-031 [8 September 2021], KC/KE-21-0089 [22 June 2021] and 1741 [9 March 2021).

**Results**

Of the 14 clinical pharmacists agreed to take part, 12 were interviewed by telephone that allowed for data saturation to be reached. Each interview lasted approximately 30 to 45 minutes. Five barriers and three facilitators were identified as main themes. The main themes and their corresponding subthemes are outlined in Table 1.

**Barriers**

*Penetration into the healthcare system*

Some participants felt that their role was not well recognised and expressed that the lack of recognition was not an issue of trust or confidence, but rather a lack of understanding of their role. The culture of medical dominance was also perceived as a barrier. Participants observed that CPSs were not appreciated by some physicians. They contested that some physicians were reluctant to change their practice:

*“… when you talk about dosage adjustments and TDM [therapeutic drug monitoring] etc… who should do it? Traditionally this is a role of doctors… it is not that they have taken our service away per se, but rather this is set like as the foundation of their job.” (P8, Hospital D)*

The reasons for said resistance to change were multifaceted, including the belief in whether clinical pharmacists can provide good services and the idea of deskilling in medication knowledge. Some clinical pharmacists contended that such resistance was interlinked with internal factors within the pharmacy profession, which are described in a subsequent section of this paper. Participants also expressed that the current CPS programme might not have been implemented as successfully as was the case for other countries because the programme was introduced only recently in Hong Kong, such that its implementation is acknowledged to progress only with time.

*Practice environment constraints*

Participants felt difficulty performing their services because of their heavy workload. They believed that CPSs were under tremendous pressure and sometimes stretched beyond capacity:

*“We can only afford to provide a half-day service due to the limitation of manpower… as a result, we cannot participate in the afternoon medical rounds…” (P5, Hospital C)*

The pharmacist-to-patient ratio was also put into question. Some participants expressed that their work has been constrained by the number of patients under their care each day as a result of limited resources. Some participants believed that supply was prioritised over clinical services:

*“I think at the moment our priority has been put onto the operational side of work. It feels that the clinical work is something in addition…” (P4, Hospital C)*

One participant believed that the root of the problem with the availability of clinical pharmacists was also related to the lack of clear division between primary and secondary care. Participants highlighted that a better-structured pharmacy framework, with a well-defined separation of roles within the department, could enhance the availability of clinical pharmacists to perform their duties.

*Support from administrative stakeholders*

Clinical pharmacists expressed their difficulty with obtaining support from administrative stakeholders because they held different views on outcome measures:

*“It is quality versus quantity. A lot of statistics have shown that the focus is on quantity, no measurements on quality based on my understanding.” (P7, Hospital A)*

As a consequence, administrative stakeholders were not committed to investing in clinical pharmacists, thus limiting the resources available. One participant explained that from the stakeholders’ perspective, investing in clinical pharmacists might not be as attractive as investing in other healthcare professionals in terms of cost-effectiveness. Moreover, clinical pharmacists commented on their struggle with manpower allocation because of resource shortages. A paradigm shift to what clinical service pharmacists should provide and the fact that resource allocation towards paediatric CPSs lacked sustainability to provide requested services were pointed out as well.

*Governance of the profession*

Participants reflected that the level of implementation differed across hospitals owing to a lack of standardisation in practice; this made it difficult for stakeholders to comprehend the role of clinical pharmacists, thus leading to the profession being less recognised. Some pointed out that having general professional bodies such as councils or societies in place can help provide not only standard practice guidelines but also training requirements so that the skills of clinical pharmacists can be maintained at a competent level:

*“… for example in SickKids [The Hospital for Sick Children, Canada], clinical pharmacists would need some sort of credentialing… whether we are competent to provide these services, they should all be included in the guidelines…” (P9, Hospital D)*

Moreover, they believed that a professional body could also act as a credentialing organisation to ensure that all paediatric clinical pharmacists maintain their current credentials and skills, thus providing stakeholders with reassurance that all clinical pharmacists have undergone stringent scrutiny regarding their ability to practice:

*“… we should have something similar to the PGY [residency programme] system in the USA, where it is clearly defined what competencies have to be fulfilled and what to expect when you deliver the service…” (P12, Hospital D)*

*Partnership with universities*

Stronger collaboration with universities was suggested by participants. They believed that it helps provide localised evidence that administrative stakeholders seek and enables clinical pharmacists to deliver evidence-based practice in paediatrics:

*“… I think that the research aspect within the clinical pharmacy in Hong Kong is rather weak, and we often need to extrapolate the data towards our own population…personnel from universities can help to consolidate, analyse and to publish papers.” (P3, Hospital B)*

With regard to centralised training, some clinical pharmacists claimed that the paediatric advanced training course provided to them did not match their practice and lacked sustainability; they suggested that continuous developmental education in this specific area should be embedded in their training.

**Facilitators**

*Healthcare professionals’ trust and confidence in CPSs*

Most participants felt that paediatric CPSs were well supported by doctors and nurses:

*“… because of the development of the service we often see them [doctors and nurses] directly, and the exchange of information has improved as we often see face-to-face, and therefore we have become the provider of some important information…” (P3, Hospital B)*

Examples of how CPSs have helped other healthcare professionals include their time efficiency, training provision and prevention of medication errors. In addition, participants believed that CPSs have allowed for more direct and coherent communication with other healthcare professionals and that this, in turn, has helped encourage good rapport, thereby resulting in the development of trust and confidence in CPSs .

*Support from the pharmacy management team*

As a whole, clinical pharmacists thought that the support given by the pharmacy management team was adequate, whether it was centrally or peripherally provided:

*“Colleagues had the opportunity to receive overseas training… for local training, apart from inter-cluster training where pharmacists can have a better understanding of how other hospitals provide their service, HA would also collaborate with CUHK [the Chinese University of Hong Kong] to provide advanced specialty training course…” (P2, Hospital A)*

Participants acknowledged the team’s effort in providing a wide spectrum of training to equip them in delivering seamless services. They agreed that the team has put considerable effort into providing adequate training, for which they showed appreciation.

*Clinical pharmacists’ self-efficacy*

Participants’ attitudes were affected by factors, such as manpower, training, work relationship and support, and these interlinked factors consequently affected participants’ perceptions towards the implementation of CPSs. Another attitudinal factor that was identified to be key to successful CPS implementation was self-initiative. Participants believed that being enthusiastic and passionate about the job was important and hence affected their work outcomes:

*“… it is important for individuals to have the passion to drive the service forward… because even though there is adequate training, they can only deliver what is best if they have the passion…” (P11, Hospital A)*

They believed that CPSs have enhanced their involvement in disease management and made them feel that they were part of a multidisciplinary team. Participants also reflected that CPSs have given parents or caregivers an opportunity to understand their children’s medications better.

**Discussion**

Factors that influenced the implementation of paediatric CPSs in Hong Kong were identified in this study using a qualitative research methodology. These included penetration into the system, practice environment constraints, support from the administrative stakeholders and pharmacy management team, governance of the profession, healthcare professionals’ trust and confidence, partnership with university, and clinical pharmacists’ self-efficacy.

As it is the first qualitative study to be conducted in Hong Kong in paediatric CPS, its results can help provide qualitative evidence to promote systematic uptake of research findings into routine practice. A robust reporting system was used to ensure the credibility and confirmability of the research. However, this study has some limitations. First, its results have limited generalisability as the participants were recruited from one city only; participant sampling across more hospitals would be desirable but due to the limitation in resources and the difficulties in nominating additional PIs for each region as per local research ethics committee guidelines, we were unable to recruit in more study sites. Second, with the participants having been interviewed via telephone, the possibility of loss of nonverbal data cannot be excluded. Lastly, as the focus of this study was on public services, the implementation of CPSs in the private sector was not explored.

The availability of clinical pharmacists has a major influence on the implementation of CPSs. This barrier was related to both the institutional and organisational levels, with administrative factors being reasons behind the hindrance. The availability was further limited by the operational demand of dispensing work. A well-structured pharmacy service framework (e.g. that which separates clinical from dispensing duties) and the designation of specific roles (e.g. training, information technology and drug information) could help clinical pharmacists provide clinical services as described. To achieve this, stakeholders must first recognise the importance of this specialised branch of pharmacy within the healthcare system; however, persuasion of administrative stakeholders may be challenging, as researchers have highlighted the paucity of robust research regarding the impact of CPSs on organisational and patient outcomes and the lack of information to support the most efficient use of available resources [17]. With scarce support from administrative stakeholders, the implementation costs for service provision and coverage serve as a barrier. Indeed, staff shortages, workforce issues and timeliness of services were identified as important factors that influenced service access shortcomings in Hong Kong [18]. The lower health expenditure in Hong Kong compared with that in countries with well-established CPSs, such as the United States and the United Kingdom, could partially explain why administrative stakeholders have been under careful scrutiny concerning their healthcare budget allocation [19, 20]. A high level of collaboration between hospitals and universities could help consolidate the evidence on the impact of paediatric CPSs on clinical, humanistic and economic outcomes using systematic and pragmatic approaches, which would provide robust and localised evidence to the stakeholders.

The infrastructure of Hong Kong’s healthcare system also has an effect on the implementation of paediatric CPSs. A shared-care healthcare model between the primary and secondary care sectors is vital in ensuring that patients receive high-quality care [21]. For example, the National Healthcare Service has stipulated guidance on the responsibility of prescribing and supplying medicines between primary and secondary or tertiary care, thus advocating the provision of medicines optimisation [21]. Such organisational initiatives could make the best use of clinical time and resources in different healthcare disciplines, including clinical pharmacy.

Healthcare professionals’ attitudes were a major factor that influenced the implementation of paediatric CPSs in Hong Kong. Participants highlighted that other healthcare professionals were not clear on clinical pharmacists’ roles and where they stand within the healthcare infrastructure. A lack of knowledge of pharmacists’ clinical roles amongst nurses and physicians has been identified by other studies, thus reflecting the lack of interprofessional academic training and collaborative practice agreements in this aspect [22, 23]. This barrier has been identified in various clinical areas, including dementia, and in geriatric healthcare. The reluctance of some physicians to accept a shared-care model has been articulated, and this resistance to change challenges the implementation of paediatric CPSs. This finding is somewhat unsurprising as medical dominance continues to define Hong Kong’s health policy, which reinforces the classical view of professional hierarchy [18]. With the growing interest in a collaborative model of healthcare delivered by multidisciplinary teams across global healthcare systems, coordinated action is needed and is crucial to fostering true collaboration across influential institutional bodies at the professional, managerial and governmental levels. It will influence the regulatory and economic factors that facilitate a multidisciplinary healthcare framework [24].

Clinical pharmacists’ psychological factors, including lack of confidence and fear of risk-taking, are frequently identified as barriers when implementing clinical services, even in countries with more established CPSs, such as Australia, Canada and the United Kingdom [25, 26]. Training was a factor that affects clinical pharmacists’ attitudes. A more structured training programme is warranted across the spectrum of paediatric clinical pharmacy career stages. Additionally, stronger collaboration with universities to provide continuous and specialised training, such as the clinical pharmacy training provided by the Centre for Pharmacy Postgraduate Education in the United Kingdom, is highly recommended because emerging evidence has suggested that having university research positions within the healthcare system influences the research skills and participation of allied healthcare professionals [27].

Standardisation of practice is essential to facilitate the implementation of CPSs, and the regulation of the profession could allow for the skills of paediatric clinical pharmacists to be maintained and sustained at a high level. For example, in the United Kingdom, the Royal Pharmaceutical Society has developed the Advanced Practise Framework [28]. In doing so, the society defined the multiple domains of practice necessary for advanced practice and provided clarity on what skill differentiation, at various levels, is prerequisite to progress along the practice spectrum, whilst also being responsible for the credentialing process [28].

Hong Kong has a statutory body responsible for pharmacist registration, namely, the Pharmacy and Poison Board, but it lacks a professional council, unlike the case for the medical and nursing professions. Nevertheless, a call to enact government policies establishing a pharmacy council dedicated to the continuous quality enhancement of professional practice, with consistent standards as an agenda, is currently in motion. The definition of clinical practice competence and the creation of an infrastructure to allow for the development of competence skills across the spectrum of different career stages are important in equipping clinical pharmacists in their delivery of paediatric CPSs in Hong Kong [29].

**Conclusion**

The clinical pharmacists interviewed in this study reported that the successful implementation of paediatric CPSs in public hospitals in Hong Kong is an area of continued development with several key barriers. The major implementation barriers identified include the availability and coverage of clinical pharmacists for service provision. Nevertheless, clinical pharmacists and healthcare professionals were found to have not only positive attitudes towards CPSs but also support from clinical and pharmacy management teams. An enhanced internal and external governance infrastructure within the pharmacy profession would allow for the standardisation of practice and training, which would ultimately help drive the implementation of CPSs forward as a whole.

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| **Barriers** | **Facilitators** |
| * Penetration into the healthcare system
	+ *Understanding of clinical pharmacist’s role*
	+ *Culture of medical dominance*
	+ *Time for service to implement*
* Practice environment constraints
	+ *Increased workload*
	+ *Competing priorities*
* Support from the administrative stakeholders
	+ *Acknowledgement of outcome measures*
	+ *Limitation of resources*
	+ *Budget allocation in pharmacy services*
* Governance of the profession
	+ *Lack of standardisation of practice*
	+ *Need of professional bodies for practice guidelines and accreditation*
* Partnership with universities
	+ *Liaise to bring local research to evidence-based practice*
	+ *Provision of training for specific needs*
 | * Healthcare professionals’ trust and confidence in CPSs
	+ *Seeing the benefit*
	+ *Coherent and direct communication*
* Support from the pharmacy management team
	+ *Provision of comprehensive training*
	+ *Allocating manpower to provide service coverage*
* Clinical pharmacists’ self-efficacy
	+ *Job satisfaction and self-esteem*
	+ *Attitude to drive the profession forward*
 |

Table 1. Summary of themes and subthemes.